

# Make sense of problems and persevere in solving them.

Mathematical Practice 1



*When presented with a problem, I can make a plan, carry out my plan, and evaluate its success.*

## BEFORE...

**EXPLAIN** the problem to myself.

- *Have I solved a problem like this before?*

**ORGANIZE** information...

- *What is the question?*
- *What do I know?*
- *What do I need to find out?*
- *What tools/strategies will I use?*

## DURING...

**PERSEVERE**

**MONITOR** my work

**ASK** myself, "Does this make sense?"

**CHANGE** my plan if it isn't working out

## AFTER...

**CHECK**

- *Is my answer correct?*
- *How do my representations connect to my solution?*

**EVALUATE**

- *What worked/didn't work?*
- *How was my solution similar or different from my classmates'?*

# Reason abstractly and quantitatively.

Mathematical Practice 2



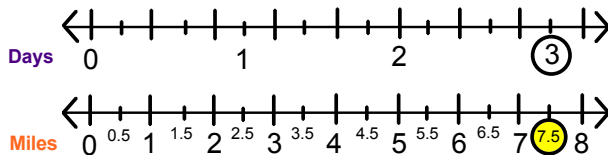
*I can contextualize numbers,  
decontextualize words, and use reasoning  
habits to help me make sense of problems.*

## Contextualize

$$2.5 \times 3 = 7.5$$

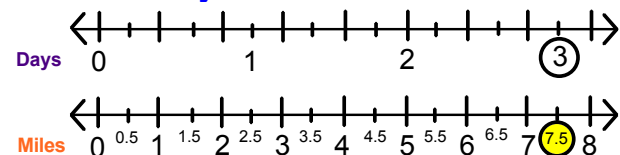


Sam walked 2.5 miles per day for 3 days.  
How many total miles did he walk?



## Decontextualize

Sam walked 2.5 miles per day for 3 days.  
How many total miles did he walk?



$$2.5 \times 3 = 7.5$$

## Reasoning Habits

- 1) Make an understandable representation of the problem.
- 2) Think about the units involved.
- 3) Pay attention to the meaning of the numbers.
- 4) Use the properties of operations or objects.

# Construct viable arguments and critique the reasoning of others.

Mathematical Practice 3



***I can make conjectures and critique the mathematical thinking of others.***

I can make, justify (prove), and present arguments by...

- using objects, drawings, diagrams and actions
- using examples and non-examples
- applying context

I can critique the reasoning of others by...

- listening
- asking questions to clarify or improve arguments
- comparing strategies and arguments while identifying flawed logic

# Model with mathematics.

## Mathematical Practice 4



***I can recognize math in everyday life and use math I know to solve problems.***

**I can...**

Kylie needs to read a book with 247 pages in 3 weeks. She's hoping to finish it in 2 weeks. About how many pages does she need to read per day?

Use **estimates** to make the problem simpler.

I will **round** to the whole page.

Find **important numbers**.

Pages to read: **247**

Weeks to read: **2 or 3**

Consider my **answer** –  
**Does it make sense?**

The more days Kylie reads, the fewer pages per day she has to read. That makes sense!

Think about the **relationship** to find an **answer**.

Kylie will need to read 18 pages per day to finish in 2 weeks and 12 pages per day to finish in 3 weeks.

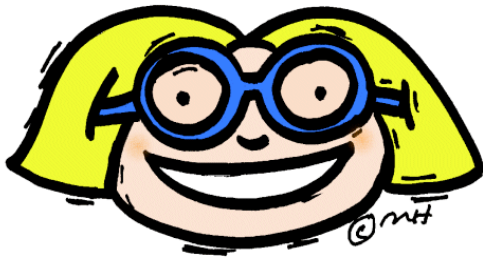
Weeks to read	Pages to read
0	0
1	36
2	18
3	12

Use **tools** to show relationships.

**...to solve everyday problems.**

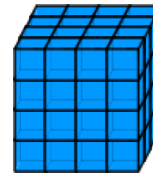
# Use appropriate tools strategically.

Mathematical Practice 5



*I can use certain tools to help me explore and deepen my math understanding.*

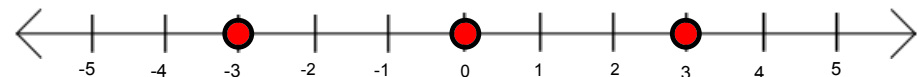
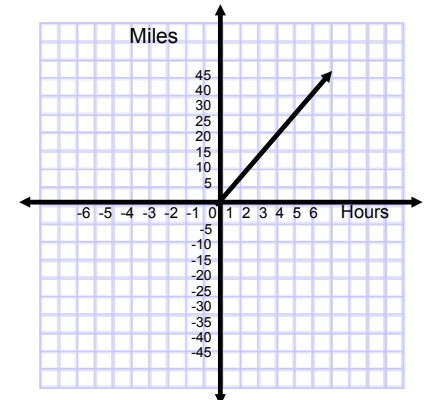
- I know **HOW** and **WHEN** to use math tools.
- I can reason: "Did the tool I used give me an answer that makes sense?"



$$V = b \times h$$

X	Y
1	100
2	200
3	300

$$a \times b = b \times a$$



# Attend to precision.

Mathematical practice 6



***I can use precision when solving problems and communicating my ideas.***

**Mathematicians attend to precision by using...**

How much chocolate will each person get if 3 people share  $\frac{1}{2}$  lb. of chocolate equally?

$\frac{1}{2}$  lb.  $\div$  3 people =  $\frac{1}{6}$  lb. of chocolate each

units of measure      symbols      context

The diagram illustrates the components of the equation  $\frac{1}{2}$  lb.  $\div$  3 people =  $\frac{1}{6}$  lb. of chocolate each. A blue dashed line labeled "symbols" connects the fraction  $\frac{1}{2}$  and the number 3. An orange dashed line labeled "units of measure" connects the unit "lb." and the unit "lb.". A green dashed line labeled "context" connects the word "people" and the phrase "of chocolate each".

- math vocabulary with clear definitions
- symbols that have meaning
- context labels
- units of measure
- calculations that are accurate and efficient

# Look for and make use of structure.

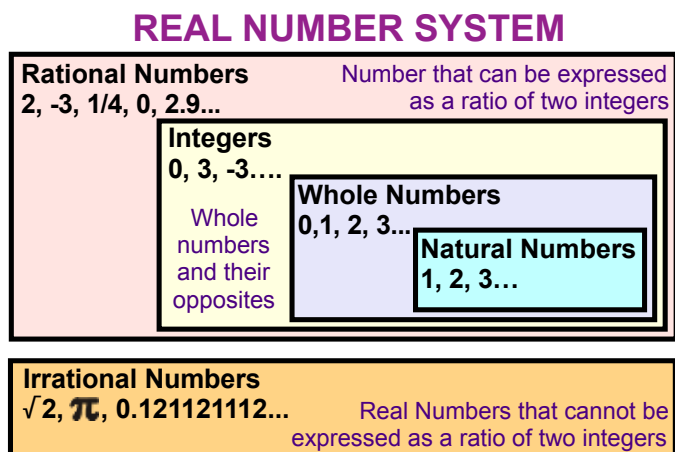
Mathematical Practice 7



***I can see and understand how numbers and spaces are organized and put together as parts and wholes.***

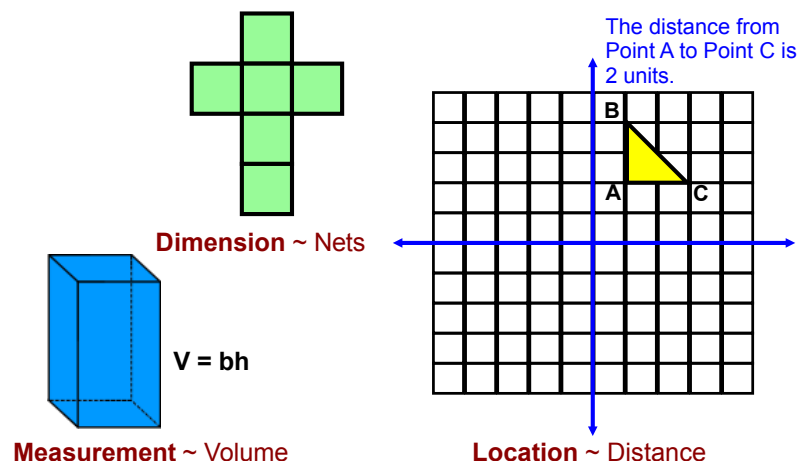
## Numbers

For Example:



## Spaces

For Example:



# Look for and express regularity in repeated reasoning.

Mathematical Practice 8



***I can notice when calculations are repeated. Then, I can find more general methods and short cuts.***

## As I work...

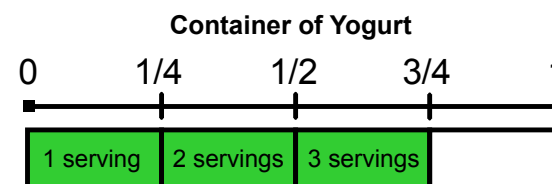
...I think about what I'm trying to figure out while I pay attention to the details.

...I evaluate if my results are reasonable.

EXAMPLE: I have a container of yogurt that is  $\frac{3}{4}$  full. One serving of yogurt is  $\frac{1}{4}$  of the container. How many servings are left in the container?

(THINK: How many  $\frac{1}{4}$ 's are in  $\frac{3}{4}$ 's?)

I can notice that  $\frac{1}{4}$  is repeated and draw a model to figure out the number of servings left in the container.



Once I understand division of fractions, I can use a short cut to solve it like this.

$$\frac{3}{4} \div \frac{1}{4} = \frac{3}{4} \times \frac{4}{1} \rightarrow \frac{3}{4} \times \frac{4}{1} = \frac{12}{4} \rightarrow \frac{12}{4} = \frac{3}{1} \rightarrow \frac{3}{1} = 3$$